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U.S. ARMY- BAYLOR UNIVERSITY
GRADUATE PROGRAM IN HEALTH CARE ADMINISTRATION

# MAILED APPOINTMENT REMINDERS THROUGH THE COMPOSITE HEALTH CARE SYSTEM (CHCS) : AN ANALYSIS OF THEIR COST-EFFECTIVENESS

A GRADUATE MANAGEMENT PROJECT
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IN PARTIAL FULFILLMENTS OF CANDIDACY REQUIREMENTS
FOR THE MASTERS DEGREE OF HEALTH CARE ADMINISTRATION

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MAY 24, 1995

## ABSTRACT

The Military Health Care System is undergoing some drastic changes from the Lead Agent managed care plan to Capitation. With these changes in the Military Health Care System, it is becoming more important to manage the resources of both people and dollars effectively. An area that affects the productivity of a military hospital is the patient no-show rate. At the Naval Medical Center San Diego (NMCSD), the patient no-show rate varies in the clinics from 3 percent to almost 20 percent of the patients seen each month. Considering that some clinics see over 2,000 patients a month, this can lead to a significant number of failed appointments. This study looked at the cost-effectiveness of mailed appointment reminders through the Composite Health Care System (CHCS). A sample of five outpatient clinics were studied during a three month period with and without the use of the automated patient mailers. A control group of five randomly selected clinics that did not use the mailers was also studied for the same time period. The results were that none of the clinics that implemented the mailers showed a statistically significant reduction in their no-show rate, $P<.05$. Although none displayed a statistically significant reduction, Ophthalmology did reduce their no-show rate by 3.57 percent. If a clinic had a no-show rate of 7 percent or less the rate will vary due to chance. Clinics with a no-show rate of greater than 7 percent can improve their no-show rate with the implementation on the patient mailers. The cost of a patient no-show was determined using the Medical Expense Performance Reporting System (MEPRS). The cost of a patient no-show was determined to be between $105.00 and $164.00, as compared to the cost of a mailer $0.52. To properly evaluate the cost-effectiveness of the patient mailers each clinics no-show rate and cost of a no-show should be individually evaluated.

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## I. Conditions That Prompted the Study

The Military Health Care System is undergoing some drastic changes from the Lead Agent managed care plan to Capitation. With these changes in the Military Health Care System, it is becoming more important to manage the resources of both people and dollars effectively. Commanders of Military Treatment Facilities must look at undertaking only the programs that will give them the greatest return for their investment and provide the most good for the beneficiary population. The Naval Medical Center San Diego, California (NMCSD) is among the many facilities in the U. S. going through these changes.

An area that affects the productivity of a military hospital is the patient no-show rate. At NMCSD, the patient no-show rate varies from clinic to clinic and ranges from 3 percent to almost 20 percent of the patients seen each month. Considering that some clinics see over 2,000 patients a month, a significant number of failed appointments may occur. Patient no-show rates can have a significant negative effect on the productivity of a given clinic and the Medical Center as a whole (Deyo et al.1980).

There are numerous costs associated with a patient breaking an appointment. First, there is the cost associated with the provider and the staff's idle time. During the course of a day, when the provider has downtime due to a patient breaking an appointment, the facility/government is paying the provider and their staff whether he/she is seeing a patient or not. The other cost associated with the appointment failure rate is the cost to the patients. This includes both the patient who broke the appointment and the one who could not get an appointment for the time slot that was already taken.

When a patient fails to make an appointment it usually is not because their medical condition changed. The usual reason for a missed appointment is a schedule conflict (Barron et al.1980). Because the patient's medical condition did not improve, there is a potentially higher cost of treatment when the patient finally comes in and the condition has worsened. Additionally, there is a cost to the clinic because of not scheduling someone else for that appointment time. When looking at the pillars of health care; cost, quality, and access, if a clinic or facility can reduce the number of missed appointments it experiences, it can have a positive impact on access to care.

Currently among the clinics at the Naval Medical Center San Diego, no-show rates are reported through the Composite Health Care System (CHCS). This has been reported for over one year. During the month of June 1994, some clinics implemented the Mailer portion of CHCS. This program is part of the Patient Appointment and Scheduling (PAS) module of CHCS. The clinics flag the patients in CHCS when they make the appointment and the computer staff prints out a mailer for the clinics to pick up and mail. The actual mailer is composed of three pieces of paper with a carbon slip between each. The patient's address is printed on the outside and a friendly reminder with the phone number of the clinic is printed on the inside. Part of the cost of the current mailer is postage at $0.29 each. There are other costs associated with producing this mailer, such as the computer time. The computer room is currently printing out about 4,000 mailers per month for all of the clinics. Since the implementation of the mailers in June 1994, no one has looked at how the mailers affect the patient no-show rate.

## II. Statement of the Problem

The problem at NMCSD is that no one has looked at the efficacy of the patient mailers since their implementation in June 1994. Some of the clinics were using a central appointment system, but that was disbanded two years ago. Since the decentralization of appointment making, many clinics have adopted their own systems for making appointments. A study has not been conducted to look at each of the clinics to see if one clinic has a better system of improving patient satisfaction and lower the no-show rates.

In this time of shrinking budgets and capitation just around the corner, the NMCSD can not afford to conduct programs that are not cost-effective. If the hospital continues to send out the mailers, about 4,000 per month, this will add up to a significant amount of time and resources over the course of a year. If the mailer system is not having a positive impact on the failed appointment rate, and therefore access to care and patient satisfaction, then it would not be wise to continue to waste resources on the program. By studying the effect of the program and determining a cost of the intervention, NMCSD will be able to make informed decisions on which clinics should use the program and what ways to make the program more effective.

## III. Literature Review

The health care system has come under scrutiny for many reasons. Two of the greatest problems have been rising health care costs and access to care. Many authors feel that broken appointments have contributed to rising health care costs and have had a negative impact on the

access to quality medical care (Bean et al. 1992). During the past five to seven years there have been over 1,000 articles, published in reputable journals, addressing the issue of patient compliance. A patient no-show is operationally defined as,"a patient who fails to keep a scheduled appointment and does not cancel in advance". (Macharia et al. 1992) There are numerous ways for an appointment to be broken. First, a patient can cancel their appointment prior to the scheduled time. This is not going to affect the provider, given it is done with enough lead time for the provider to schedule someone else in during the cancelled appointment time. Another way an appointment can be broken is by the provider. This usually will not cause problems for the provider, since it is assumed that the provider would not cancel an appointment deemed necessary for the medical condition of the patient. The primary area that the literature addresses is the breaking of an appointment by the patient who simply does not show for their appointment.

The problems associated with a patient not showing up for a scheduled appointment are the costs of idle provider time and the potential of the patients medical condition decreasing. Bigby (1983) suggests that there are two potential ways to determine the cost associated with a patient breaking an appointment. The first, is to determine the cost of all the annual salaries of the professional staff and then divide by the annual number of visits. This calculation will yield an average visit charge. The second method is determined by taking the annual salaries and multiplying by the no-show percentage rate (Bigby et al.1983). Both methods demonstrate that no-shows impact the revenue of a clinic and by reducing the no-show rate revenues can be increased.

The research has attempted to explain the reasons why a patient will break an

appointment, and the results are varied. It appears almost irrational for a patient to miss an appointment that would improve their health status, but there are as many reasons for breaking an appointment as there are patients. Badgly et al. (1961) thought that one obvious reason was the weather condition at the time of the appointment. This did not turn out to be true and only applied in the most severe weather conditions, such as a natural disaster.

Another reason examined for broken appointments was the scheduling interval, the length of time between making the appointment and the actual appointment date. The literature is varied on the conclusion of the scheduling interval. One of the problems with these studies is that the definition of a "short" or "long" interval varied from study to study. A consistent trend throughout the literature is that the longer the appointment interval, the greater the chance of a no-show (Benjamin et al.1984).

The type or urgency of care is related to the no-show rate of a clinic. In a study conducted by Ambuel et al. (1964), the broken appointment rate was 10% for urgent care, 19% for intermediate, and 30% for routine care. This research also concluded that interns and residents often schedule return visits which may not be medically necessary. This message may then be conveyed to their patients and effect the no-show rate.

The experience with interns leads to the largest reasons for missed appointments: communication and the physician patient relationship. Patients who perceive a more personal touch by the physician increase appointment keeping rates (Barron et al. 1980). Hofmann and Rockhart (1969) surveyed over 400 patients to determine what had the largest impact on missed appointments. The results were that poor communication accounted for over 30% of the population. Alpert (1964) stated, "Ongoing patient care by a single physician can increase

patient compliance." This is not currently in place at training centers like NMCSD in which students, interns, and residents rotate through the various clinics.

Because the literature on reasons for breaking appointments has not been completely conclusive, many studies have tried to identify patient variables that lead to an increased no-show rate. If traits can be identified with who is at risk of not showing up, then that population can be targeted for application of the intervention. In general, a non-white person less than forty-five years old, who has previously broken an appointment, who was referred from the emergency room, who is from a lower socioeconomic group, and who has a low education level will not show up for his/her appointment. (Barron et al. 1980) Although this generalization may seem irrational, some of the variables are consistent throughout the stream of research. A person's sex is not a predictor of missed appointments (Gates et al. 1976). Where as, patients over forty five years of age show consistently higher compliance rates (Jonas et al. 1971).

The problems with most of the research conducted on risk factors predictive of poor appointment attendance is that they have used univariate analysis. By using only univariate analysis such as Chi Square or t-tests, it is not possible to distinguish if the factor is only predictive because of its correlation to other factors (Kavanagh et al. 1989). In a study conducted by Kavanagh of a pediatric clinic, a multivariate analysis identified parental education, parental age, patient's age, and family ownership of a car as independent factors affecting a patient's attendance. Patient's race was not identified as an independent factor but it did correlate to ownership of a car, parental age, and parental education. By using a multivariate analysis, Kavanagh defined more predictive risk factors associated with a high no-show rate. He used this information to build an argument for promoting family centered case management.

The solutions to missed appointments can be broken down into two groups: change the appointment-keeping behavior of the patient or change the scheduling of the appointments (Barron et al. 1980). The attempts to change patient behavior have lead to the identifying of patients at high risk of breaking an appointment, but this can be difficult in a large setting. One of the most cost-effective ways to change patient behavior is the use of some sort of patient appointment reminder.

The literature concludes that some form of reminder close to the time of the scheduled appointment reduces the number of missed appointments. Nazarian et al. (1974) showed that a 20 percent reduction in the no-show rate could be accomplished with the use of a postcard reminder sent out one week prior to the scheduled appointment. There have been some studies on the cost-effectiveness of the mailed reminders and they have concluded that the cost of the intervention, usually around $0.50 per mailer, is much less than the cost of the missed appointment, which has been estimated for some small clinics to be about $30.00. At a large facility such as NMCSD the cost of a missed appointment would be even greater.

The other solution to reduce the no-show rate is to change the appointment schedule. There is not an extensive body of research on schedule changes, but one study by Shonick and Klien (1977) offered an interesting option. The clinic determined the expected probability of someone making their appointment and then overbooked scheduling appointments to reach an expected show rate of 100 percent. The integral part of this system was the clinic's ability to predict the probability of the patient making their appointment. The cost-effectiveness of this system was inconclusive in the research.

Another scheduling system is accomplished by using what is referred to as the modified

wave approach (Macharia et al. 1992). This scheduling system schedules patients at the beginning of the half-hour and then leaves gaps for walk-ins and longer appointments. The problem with this system is it puts no value on the patient's time. Additionally, if everyone shows up at the same time, then some patients are punished with a longer waiting time.

The literature concludes that the most cost-effective way to reduce the no-show rate is some form of appointment reminder (Finney et al. 1990). The results are varied as to which are more cost-effective, mailed reminders or telephoned reminders. With the introduction of the computer generated phone reminders this system has displayed a clear cost advantage over mailed reminders.

In the past, the comparison was made between a mailed reminder and having someone from the clinic actually call the patient. In an ambulatory care study conducted by Leirer et al. (1992), the automated telephone reminders reduced appointment non-adherence between 4 percent and 50 percent. The cost associated with this system was much less than the cost of the mailer and could be expanded in ways that the mailer could not (Leirer et al. 1992). This system is used to call patients two days prior to their appointment. The phone prompt additionally asks the person to press a number on their phone pad if they will not make the appointment. This information is reported to the clinics so they can fill the vacant appointment time. Additionally, this system could be used to provide administrative information, such as directions to the clinic. The system can also be expanded to provide medication adherence reminders to patients after their visit. This technology may be the wave of the future and is much less expensive than the cost of a letter reminder, typically $0.50, and a live phone call, approximately $1.12. (Bigby et al.1983). As stated earlier, communication is one of the top reasons for a patient breaking their

appointment. A live phone call would be the best form of communication with the patient but a computer generated phone reminder system is a better form of communication with the patient than the mailed reminders.

## IV. Purpose Variables and Working Hypothesis

The purpose of this study is to determine if patient mailers are having an effect on the patient no-show rate. Additionally, cost associated with the mailers and cost associated with the patient no-show rate will be determined. By comparing these costs, the cost-effectiveness of the mailer program will be established. Once this cost has been determined, and if it is positive, this study can be used to improve the process and widespread use of the patient mailer program. Although the literature has shown that computer generated phone reminders are a cost-effective alternative, they are not currently in use in this facility. A comparison between the cost of a computer generated phone system to the results of this study will be conducted in order to inform NMCSD of its potential cost-effectiveness of the computer generated phone system.

**HO: There is no relationship between patient mailers and the patient no-show rates among clinics at NMCSD.**

**HA: There is a significant relationship between patient mailers and the patient no-show rate among the clinics at NMCSD.**

## V. Method and Procedures

Because of the decentralized clinic appointment system at NMCSD, the first step in this study will be to establish what system each of the clinics is using to make appointments. To do this, a list of standard questions will be administered to each of the clinics to determine the procedures for initial and follow-up appointments for the three major groups of patients seen. The three groups of patients seen at NMCSD are: Active Duty, Family Members and Retirees. These groups have different systems in place for appointments at some of the clinics. Additionally, these questions will gather data on the number of staff used to make the appointments, lead time for an average appointment, and the clinics familiarity with CHCS and the mailer system. Using this information as a baseline for the appointment systems that are in place at NMCSD, the clinics that will be used in this study can be selected and it will be easier to apply the results to the appropriate clinics.

The patient no-show rates will be taken out of the Composite Health Care System (CHCS). This system provides an integrated database for the Military Treatment Facilities that can be keyed in once and used for multiple purposes. The CHCS software is written in a programming language called the Massachusetts General Hospital's Utility Multiprogramming System (MUMPS). The support software, known as tools, is the interface between the programming language and the applications software. Within CHCS there are nine functional subsystems; Patient Administration (PAD), Medical Services Accounting (MSA), Patient Appointment and Scheduling (PAS), Clinical Subsystems (CLN), Facility Quality Assurance (FQA), Dietetics (DTS), Laboratory (LAB), Radiology (RAD), and Pharmacy (PHR).

For the purpose of this study the Patient Appointment and Scheduling (PAS) will provide the necessary information. The PAS subsystem manages outpatient administrative data. The PAS subsystem enables individual clinics or providers to track the number of patients seen and control patient scheduling, booking, and appointments. PAS also alerts other system users to potential scheduling conflicts. The report used to gather the data on the patient no-shows by clinic will be the Command Facility Workload Recap Report.

To determine if the patient mailers in CHCS have had a positive impact on the patient no-show rate at NMCSD, an analysis of a three-month period with and without the system in place will be conducted. By studying the results of the survey and the data available through CHCS a determination will be made as to which clinics will be used for this study. The study will select five clinics that have used the CHCS mailer system for the fourth quarter 1994 and use these clinics for the analysis. Additionally, five clinics that have not used the patient mailer system will be compared for the same time period to determine if the change in the patient no-show rate varies with no type of intervention.

Through CHCS, the patient no-show rate statistics for all of the clinics during the year of 1993 are available. This study will begin by examining the no-show rate among the five clinics at the NMCSD during the fourth quarter ( July, August, and September) of 1993. This data will be used to compute a mean no-show rate, by clinic, during the fourth quarter 1993. Utilizing data from the same time period will create a baseline for this study. This will control some of the variables associated with comparing data from two different years.

The patient mailer system through CHCS has been implemented to varying degrees in about a dozen clinics since June 1994. Since June of 1994 there have been five clinics that have

used the mailer system consistently and have enough data that they can be used for this study. The five clinics that will be used are the Ophthalmology, Endocrinology, Internal Medicine, Dermatology, and Urology. These clinics all have a relatively high patient census and meet the criteria for this study. The selected criteria is that they did not use the system during the fourth quarter 1993, and they did use the CHCS mailer system during the fourth quarter 1994.

The clinics that did not use the patient mailer for either time period that will be used are Allergy, Cardiology, Gastroenterology, Oncology, and Rheumatology. These clinics will be used as a comparative standard to see if the no-show rate changed with no type of intervention. By using these clinics as a comparison, the study will be able to determine if the intervention of the patient mailers affected the no-show rate or if the rate changed just due to chance.

The reports that will be used in this study to gather the necessary information were not compiled until the end of the following reporting month. The same time period from 1994 will be used to compare to the baseline 1993 clinic no-show rate without the patient mailer system. The no-show rate, by clinic, for the fourth quarter 1994 will be used to determine the mean by clinic no-show rate in the same manner as the 1993 data.

With this data on the mean no-show rate by clinic for the fourth quarter 1993 and the fourth quarter 1994, a test for paired means will be conducted. Additionally, a statistical analysis on the totals for all of the clinics before the patient mailers and after their implementation will be completed. By using the means for the same time period, numerous variables which could have an impact on the reliability and validity of the study will be eliminated. One of the variables that will be controlled for is seasonality. This would be in question if the comparison was between the month of June 1993, typically a high turnover

month, and the month of September 1994. Additionally, many of the variables such as the population base, the catchment area, and the delivery system have remained constant over the time period being studied.

After determining the change in the no-show rate among the clinics, this study will then address the issue of cost. Through the literature review, numerous methods have been identified to determine a cost associated with a missed patient appointment. This study will look at cost through the method of fixed costs. These costs will be extrapolated from the Medical Expense Performance Reporting System (MEPRS) for the time periods from 1993 and 1994.

The MEPRS is an accounting system that is used by all fixed Military Treatment Facilities in each of the services. The purpose of the MEPRS is to provide consistent principles, standards, policies, definitions, and requirements for accounting and reporting of expense, manpower, and performance by Department of Defense fixed military medical facilities. Within these specific objectives the MEPRS also provides in detail: uniform performance indicators, common expense classification by work centers, uniform reporting of personnel utilization data by work centers, and a cost assignment methodology. The MEPRS is the basis for establishing a uniform reporting methodology that provides consistent financial and operating performance data. This information is used to assist managers who are responsible for Healthcare delivery in the fixed military medical system.

The MEPRS provides a consistent way to identify, record, accumulate, and report data from fixed military medical system activities and operations. Information provided by the MEPRS assists in measuring productivity, development of performance standards, development of programs estimating equations, categorization of management effectiveness, and

determination of areas requiring management emphasis. In addition, the MEPRS provides a means of identifying facility and system medical capability and indicates actual and potential areas for interservice support of medical workload.

The MEPRS assists managers at all levels of management in critical decision making and performance evaluation. Managers need current, accurate, and complete quantitative data for decision making, comparing actual performance with objectives, analyzing significant deviations, and taking corrective action. The MEPRS is a system of manpower and cost distribution and expense reporting that provides management with a basic framework for responsibility accounting and the flexibility to categorize financial information of functional activities that may cross organizational lines. For all of the above reasons the MEPRS is a sound system that will meet the needs of gathering data on the cost of a patient not showing up to a clinic.

This cost analysis will be accomplished by taking the salaries of all the people involved in the delivery of care in that clinic, including administrative staff and providers. To this amount the fixed costs associated with each clinic will be added. Variable costs such as the medical supplies will not be used because the primary concern is the cost associated with idle time when a patient does not show up for an appointment. After collecting the data on the monthly cost of the staff of the clinic, and fixed costs, this will then be divided by the number of patient visits per month. This will yield a cost per patient which can be multiplied by the number of patients that do not show for their appointment.

After collecting all the data on the cost associated with a missed appointment, the cost of the intervention can then be determined. Because the amount of time spent printing mailers is

such a small portion of the total time the printer is in use, such costs as depreciation of the printer will not be figured into the cost calculations. The cost of the intervention includes computer personnel who print the mailer, the cost of the clinic staff who picks up the mailer and verifies it, the cost of the actual mailer, and the postage. Once this cost has been determined an analysis between missed appointments and the cost of the intervention will be conducted. By determining these costs, each clinic can make decisions on the cost-effectiveness of their mailer program.

## VI. Results

The first step in the study was to go to all the clinics and administer the questionnaire. The information on the questionnaire focused on the number of people making appointments, the lead time for making an appointment, and how the appointment is made. The results of the questionnaire varied from clinic to clinic but they enabled the elimination of some of the clinics because of the method they were using to make appointments. The clinics that were using the mailers and the clinics that were not, were grouped together based on the results of this questionnaire. Although the clinics used many different methods for making an appointment, only the five observed in the study used the patient mailers through CHCS as a reminder. The quarterly workload of the clinics that used the mailers was examined to ensure that the study used clinics that had a large number of patient visits, a large N. Of the clinics that were selected randomly for comparison, some had a smaller workload than the clinics that used the mailers.

The results of the questionnaire determined that very few clinics used any form of reminder, but some did use a mailed card for an initial appointment notification. This card is in widespread use throughout the hospital and is filled out by hand in the clinic and serves as an

initial notification of the patient's appointment.

**Table 1. - 4th Quarter Workload**

| CLINIC | Used Mailers | 1993 | 1994 |
|---|---|---|---|
| OPHTHALMOLOGY | Yes | 4509 | 5337 |
| ENDOCRINOLOGY | Yes | 1106 | 944 |
| INTERNAL MEDICINE | Yes | 5686 | 5706 |
| DERMATOLOGY | Yes | 7978 | 7628 |
| UROLOGY | Yes | 5266 | 8380 |
| | **TOTALS** | 24545 | 27995 |

A very important point is that this study looked at appointment reminders, not initial notification. A clinic was used only if it had notified the patient of the appointment once already and the mailer was used as a second form of notification.

The next step was to determine the no-show rates of the ten clinics selected, five that used the mailers and five that were used as a comparative measure. The information was gathered using the Command Facility Workload Recap Report that took information off the CHCS database. This report is generated monthly and looks at the clinic workload and no-show information. The no-shows are broken down into three categories, each by raw number and percentage. The categories are no-shows, facility cancellations, and patient cancellations. The numbers used for this study were the no-shows (patients that just did not show for their scheduled appointment). The other numbers, facility cancellations, and patient cancellation were

not figured into the total number of no-shows.

The data from the no-show report was used to determine a no-show rate for the fourth quarter by month and mean for both 1993 (Table 2) and 1994 (Table 3). The results of the clinics which implemented the mailers are as follows: the Ophthalmology clinic had the highest no-show rate (11.60%) among all the clinics before the implementation of the mailers and Internal Medicine had the lowest (2.83%). After the implementation of the patient mailers (4th quarter 1994) Urology had the highest no-show rate (8.23%) and Internal Medicine and Dermatology both had the lowest no-show rate (4.37%).

**Table 2. - 4th Quarter 1993 No-Show Rate By Clinic**

| Clinic | Used Mailers | July | August | September | Mean |
|---|---|---|---|---|---|
| Ophthalmology | No | 10.20% | 11.90% | 12.70% | 11.60% |
| Endocrinology | No | 7.60% | 6.30% | 7.00% | 6.97% |
| Internal Medicine | No | 1.50% | 3.20% | 3.80% | 2.83% |
| Dermatology | No | 3.00% | 2.80% | 3.90% | 3.23% |
| Urology | No | 6.70% | 5.50% | 7.90% | 6.70% |
| | | | | | |
| Allergy | No | 6.25% | 4.30% | 8.20% | 6.25% |
| Cardiology | No | 4.30% | 3.80% | 4.10% | 4.07% |
| Gastroenterology | No | 6.30% | 5.90% | 7.20% | 6.47% |
| Oncology | No | 0.00% | 1.70% | 2.40% | 1.37% |
| Rheumatology | No | 3.50% | 5.90% | 7.20% | 5.53% |

**Table 3. - 4th Quarter 1994 No-Show Rate By Clinic**

| Clinic | Used Mailers | July | August | September | Mean |
|---|---|---|---|---|---|
| Ophthalmology | Yes | 8.40% | 7.60% | 8.10% | 8.03% |
| Endocrinology | Yes | 6.80% | 5.30% | 7.70% | 6.60% |
| Internal Medicine | Yes | 4.10% | 4.40% | 4.60% | 4.37% |
| Dermatology | Yes | 4.90% | 3.80% | 4.40% | 4.37% |
| Urology | Yes | 9.70% | 7.40% | 7.60% | 8.23% |
| | | | | | |
| Allergy | No | 5.20% | 4.60% | 4.00% | 4.60% |
| Cardiology | No | 2.50% | 2.60% | 3.40% | 2.83% |
| Gastroenterology | No | 4.20% | 4.40% | 6.40% | 5.00% |
| Oncology | No | 1.30% | 2.50% | 1.30% | 1.70% |
| Rheumatology | No | 5.20% | 8.20% | 7.90% | 7.10% |

Among the clinics that did not implement the mailer, the Oncology clinic had the lowest no-show rate during the 4th quarter 1993 (1.37%) and the Gastroenterology clinic had the highest (6.47%). During the 4th quarter 1994 among clinics that did not implement the mailers, Oncology still had the lowest no-show rate (1.70%), but Rheumatology had the highest rate (7.10%). The change in the no-show rate is displayed in Table 4. Among the clinics that implemented the patient mailers, Ophthalmology and Endocrinology where the only two that decreased their no-show rates. Of the clinic that implemented the mailers, Ophthalmology is the only one which saw a positive change of greater than one percent. Endocrinology's no-show rate only decreased 0.37%. Among the clinics that did not implement the patient mailers, three out of

five decreased their no-show rates.

**Table 4. - Change In No-Show Rate 93-94**

| Clinic | Used Mailers | Decrease | Increase |
|---|---|---|---|
| Ophthalmology | Yes | 3.57% | |
| Endocrinology | Yes | 0.37% | |
| Internal Medicine | Yes | | 1.53% |
| Dermatology | Yes | | 1.13% |
| Urology | Yes | | 1.53% |
| | | | |
| Allergy | No | 1.65% | |
| Cardiology | No | 1.23% | |
| Gastroenterology | No | 1.47% | |
| Oncology | No | | 0.33% |
| Rheumatology | No | | 1.57% |

A t-test for paired means was conducted on both the clinics that implemented the mailers and the clinics that did nothing (Table 5). To have a significant difference between the 1993 and the 1994 no-show rates, the P-Value must be less than .05. None of the values of any of the clinics were below .05 so none showed a statistically significant change in the no-show rate. Having said that, because of the size of some of the clinic's patient population, although the numbers are not statistically significant, they will still have an impact on the clinic. For example, Ophthalmology's no-show rate decreased by 3.57% and they had a workload of 5337 patient

visits during the 4th quarter 1994 that equals a decrease of 190 no-show patients during the quarter. Although 190 patients was not proven to be statistically significant, it did have an impact on the clinic.

**Table 5. - t-test for Paired Means Results**

| Clinic | Used Mailers | 1993 | 1994 | P-Value |
|---|---|---|---|---|
| Ophthalmology | Yes | 11.60% | 8.30% | 0.057 |
| Endocrinology | Yes | 6.97% | 6.60% | 0.457 |
| Internal Medicine | Yes | 2.84% | 4.37% | 0.107 |
| Dermatology | Yes | 3.23% | 4.37% | 0.11 |
| Urology | Yes | 6.70% | 8.23% | 0.255 |
| Totals | | 6.26% | 6.82% | 0.623 |
| | | | | |
| Allergy | No | 6.25% | 4.60% | 0.341 |
| Cardiology | No | 4.06% | 2.83% | 0.061 |
| Gastroenterology | No | 6.47% | 5.00% | 0.06 |
| Oncology | No | 1.37% | 1.70% | 0.693 |
| Rheumatology | No | 5.53% | 7.10% | 0.078 |
| Totals | | 4.74% | 4.25% | 0.474 |

The next step in the study was to determine the cost of a patient not showing up for their appointment. The cost data was extrapolated from the Medical Expense Performance Reporting System (MEPRS) monthly expense summary report. This report summarizes the expenses associated with each clinic. The expenses can be broken down by code to determine the fixed

and variable expenses. The study did not consider the variable expenses, such as expendable medical supplies to be associated with a patient not showing for their appointment, so those expenses were taken out of the total expenses. The fixed expenses such as provider salaries and utilities based on square footage were used to determine a per quarter expense associated with the five clinics during the 4th quarter 1993 and the 4th quarter 1994 (Table 6).

**Table 6. - No-Show Cost of Clinics that Used the Mailers Before and After Implementation**

| Clinic | Expense | 1993 Workload | Unit Cost | Expense | 1994 Workload | Unit Cost |
|---|---|---|---|---|---|---|
| Ophthalmology | $784,241.29 | 4509 | $173.93 | $824,540.05 | 5337 | $154.50 |
| Endocrinology | $1,077,628.63 | 5686 | $189.52 | $931,982.96 | 5706 | $163.33 |
| Internal Medicine | $919,856.77 | 7978 | $115.30 | $804,467.99 | 7628 | $105.46 |
| Dermatology | $178,416.00 | 1106 | $161.32 | $153,227.83 | 944 | $162.32 |
| Urology | $1,102,694.81 | 5266 | $209.40 | $986,052.15 | 8380 | $117.67 |

The MEPRS report also gives the workload for the quarter, and this was used to determine a per unit or per no-show cost. By dividing the total fixed expenses by the workload for the quarter yields a cost per no-show (Table 6). The no-show costs per clinic for NMCSD are consistent with the research for this size facility.

The cost of the no-shows was further computed to determine the cost of the actual number of no-show patients during the time period studied by clinic. By taking the workload and multiplying it by the percentage of no-shows, this yields a raw no-show number (Table 7).

By multiplying this raw number by the unit cost gives a total no-show cost per clinic. These costs per clinic were summed to give a cost for the 4th quarter 1993 (Table 7) and a cost for the 4th quarter 1994 (Table 8). These tables show that the cost of the no-shows for the five clinics studied was less in 1994. By comparing the total cost of the mailers in 1993 to 1994, the no-show cost decreased from $237,497.81 to $233,360.93 a difference of $4,136.99.

**Table 7. - No-Show Costs for the 4th Quarter 1993**

| Clinic | Workload | % No-Show | No-Shows | Unit Cost | No-Show Cost |
|---|---|---|---|---|---|
| Ophthalmology | 4509 | 11.60% | 523 | $173.93 | $90,973.04 |
| Endocrinology | 1106 | 6.97% | 77 | $161.32 | $12,435.87 |
| Internal Medicine | 5686 | 2.83% | 161 | $189.52 | $30,496.38 |
| Dermatology | 7879 | 3.23% | 258 | $115.30 | $29,711.59 |
| Urology | 5266 | 6.70% | 353 | $209.40 | $73,880.93 |
| | | | | **TOTAL** | $237,497.81 |

**Table 8. - No-Show Costs for the 4th Quarter 1994**

| Clinic | Workload | % No-Show | No-Shows | Unit Cost | No-Show Cost |
|---|---|---|---|---|---|
| Ophthalmology | 5337 | 8.03% | 429 | $154.50 | $66,212.69 |
| Endocrinology | 944 | 6.60% | 62 | $162.32 | $10,113.19 |
| Internal Medicine | 5706 | 4.37% | 249 | $163.33 | $40,726.69 |
| Dermatology | 7628 | 4.37% | 333 | $105.46 | $35,154.42 |
| Urology | 8380 | 8.23% | 690 | $117.67 | $81,153.94 |
| | | | | **TOTAL** | $233,360.93 |

**Table 9. - Cost of Producing and Sending the Mailers**

| | |
|---|---|
| **1. Clinic Appointment Staff 5 Hours a week** | GS-5 Annual Salary $22,505 |
| | Yearly Hours Divide by 2080 |
| | Per Hour Salary = $10.82 |
| | Times 5 Hours per Week = $54.10 |
| | Times 12 Weeks (1 Quarter)= $649.20 |
| | Times 5 Clinics = **$3246.00** |
| **2. Computer Room Staff GS-5, 1 Hour per day** | 12 Weeks (1 Quarter) = **$649.20** |
| **3. Cost of actual Mailer** | $100.00 Per box of 1000 $0.10 Each |
| **4. 4th Quarter total workload 27,995*** | 27,995 Times $0.10 = **$2,799.50** |
| **5. Postage $0.29** | 27,995 Times $0.29 = **$8118.55** |
| | **TOTAL = $14,813.25** |
| 27,995 mailers/ $14,813.25 total cost | **Cost of one Mailer = $ 0.52** |

* Workload in Table 1

The cost of the mailers was determined by looking at all the elements that went into producing and sending out a mailer. The first factor is the individual clinic's staff which spends an average of 5 hours per week picking up and verifying the mailers. The average salary of the clinic appointment staff is a General Schedule (GS) 5. The computer room staff in which the average employee is also a GS-5, spends 1 hour per day printing off the mailer. A box of 1000 mailers costs $100.00, so the cost of the actual mailer paper is $0.10. The issue of postage could be looked at in two different ways. One, because the post office is also a branch of the government, postage could be looked at as a cost transfer from one branch of the government to

another... from the military to the post office. For this study the cost of postage was figured into the calculation because postage comes out of the Medical Center operating budget. The final number figured into the calculation was the total number of mailers sent out for the five clinics studied during the fourth quarter 1994. Table 9 shows that the total cost of the mailers sent out was $14,813.25 and the cost of one individual mailer was $0.52.

The total cost of sending out all the mailers was $14,813.25 as compared to the reduction in the cost of the no-shows which was only $4,136.99. At first glance this would look like the entire mailer program is not cost-effective. To get a true breakdown of the cost of the intervention and the cost of the no-show by clinic, a comparison of the cost of one patient breaking an appointment and the cost of sending out one mailer was conducted in table 10.

**Table 10. - Comparison of One No-Show to One Mailer by Clinic 4th Quarter 1994**

| Clinic | Cost of One No-Show | Cost of One Mailer |
|---|---|---|
| Ophthalmology | $154.50 | $0.52 |
| Endocrinology | $162.32 | $0.52 |
| Internal Medicine | $163.33 | $0.52 |
| Dermatology | $105.46 | $0.52 |
| Urology | $117.67 | $0.52 |

By using the Ophthalmology clinic as an example, if one out of 297 mailers worked by reducing the no-show rate by one person, it would be cost-effective. This was determined by dividing the cost of the no-show by the cost of the intervention. The clinic could send out 297 reminders for the cost of one patient not showing for their appointment ( $0.52 * 297= $154.50).

## VII. Discussion

Implementation of the questionnaire brought up many issues that were not readily apparent from the other data that was collected. One of the biggest issues brought up by the questionnaire was the use of a mailed hand-written card by many of the clinics. These cards are about the size of an index card and the date of the appointment and the patient's address must be filled out by hand and then mailed. These cards take up a lot of time and some clinics devote an entire afternoon of administrative time to just doing cards. These cards are used primarily as an initial form of appointment notification.

The number of staff, number of CHCS terminals, and number of phones all were in proportion to the size of the clinic. Appointments were generally made in the same manner in the five clinics that were used for the evaluation of the mailers. The patient would get either a verbal notification prior to leaving the clinic about their appointment or they would get a phone call for their initial notification. During the 4th quarter 1993, there was no form of second notification given to the patients. For the clinics studied during the 4th quarter 1994, the mailers through CHCS were used as a second form of notification. For an initial appointment, a consult was given to the appropriate clinic and the clinic would call or send out one of the hand-written cards as a form of initial notification, and then a mailer was sent out through CHCS to remind the patient of the appointment.

The mailers were sent out only for those patients that had an appointment with a lead time greater than that set up by the clinic. For example, the Ophthalmology clinic did not send out a mailer for patients that had appointments within two weeks. If a patient had an

appointment that was greater than two weeks away, they received a mailer seven days prior to their appointment.

The preparation and sending of the actual mailer is accomplished in a very inefficient manner. The provider's profile is set to print or not to print a mailer in CHCS. The computer room prints off the mailers every night and someone from each of the individual clinics comes down to the computer room every day to pick up the mailers. The clinic staff then takes the mailers back to the clinic to verify the person has the appointment is printed on the mailer by comparing it to their CHCS terminal. The clinic staff then tears off the top of the mailer and files it as a copy. They then take the stack of mailers down to the mail room and they are sent out. This entire process is accomplished for every mailer. This process could be streamlined with a little central control and the time could be better used by the clinic staff.

As noted in Table 4, of the five clinics that used the mailers in the 4th quarter 1994, three out of the five actually increased their no-show rate. According to Bigby (1983) if a clinic's no-show rate is below 5 percent then there is little that they can do to lower the rate. It is just a matter of fact that some people do not show for their appointments. There are many factors that can affect someone's decision to show for their appointment. The type of clinic may have something to do with the no-show rate. Some clinics that may be considered more as a convenience issue such as Ophthalmology or Dermatology may find that a patient will make a decision not to come to their appointment, as opposed to a life threatening disease clinic like Cardiology, in which the patient would be more motivated to make their appointment. The clinic that had the highest no-show rate, Ophthalmology, showed the greatest change in the no-show rate.

Among the clinics that did not use the mailers during 1993 and 1994, the resulting change in the no-show rate was varied but none changed more than 2 percent. These clinics were chosen randomly and three of the five actually decreased. Upon inspection of the clinics there was no significant factor that accounted for the change in the no-show rates among these clinics during the time period studied, except for random variability.

The t-test for paired means showed no statistical significance due to the small percentage of change each clinic experienced. The no-show rates by month and the totals also did not show any statistically significant change. The clinic that was the closest to having a statistically significant change was the Ophthalmology clinic with a P-Value of 0.057. It makes sense that this clinic had a P-Value nearest to 0.05 because it had the greatest change in its no-show rate.

The unit fixed expense for each of the clinics that used the mailers was appropriate for a facility of this size. Some of the workload in clinics like Urology's went up but the fixed expenses went down slightly. This can be explained by the fact that mix of staff changed over the time period, which lowered the salary expenses. With the number of patients seen increasing, the per patient expense decreased.

The data on the cost of a no-show stayed relatively constant during the two time periods studied. The total cost of the no-shows per clinic during 4th quarter 1993 and 4th quarter 1994 decreased but this amount was not less than the total cost of the mailers. By breaking out the cost of the individual mailer and the individual cost of a no-show by clinic a better decision about the cost-effectiveness can be made. In a clinic like Ophthalmology, with a high no-show rate, the cost of sending out the mailers is worthwhile because the cost of one no-show is far greater than the cost of the mailers for that clinic. The hospital spent $10,263.46 on mailers for

the Ophthalmology clinic during the 4th quarter 1994 but they reduced their cost of no-shows by $24,760.35. In this instance the mailer program is cost-effective for the Ophthalmology clinic.

## VIII. Conclusions and Recommendations

The purpose of this study was to determine if the implementation of patient mailers through CHCS had an affect on the patient no-show rate among clinics at the NMCSD. In general, the implementation of the patient mailers did not have an affect on the patient no-show rate among clinics at NMCSD. Although only one clinic showed significant reduction in the no-show rate some inferences can be made from that clinic because it stands out from the other clinics. Among the clinics that were studied, the Ophthalmology clinic did have the highest no-show rate to start with. The research by Bigby (1983) stated that clinics with a no-show rate around 5 percent can do little to affect their no-show rate and this was supported by this study.

By using five randomly selected clinics as a means of comparison to the clinics that used the mailers, a conclusion can be made about the behavior of the no-shows at NMCSD. This study showed that if the no-show rate was 7 percent or less it varied only due to chance. The Endocrinology clinic was just below 7 percent (6.97%) and its rate decreased but very slightly.

### Conclusions

**1. Clinics with a no-show rate of 7 percent or greater can benefit from the implementation of patient mailers.**

Clinics that have a high no-show rate can achieve the greatest benefit from the implementation of the patient mailers because there is much greater room for improvement. The

no-show rate demonstrated by this study was 7 percent which is close to what the literature supports of 5 percent. Clinics with the higher no-show rate will also realize the greatest cost savings because their initial no-show costs will be much higher.

**2. Clinics with a no-show rate of less than 7 percent will vary just due to chance.**

The five clinics that were selected at random displayed no-show rates that actually improved greater than that of the clinics that used the patient mailers. While none of the randomly selected clinics displayed as much of an improvement as the Ophthalmology clinic (3.57% decrease), three out of the five decreased, as compared to the clinics that used the mailers in which three out of the five increased. All of the clinics that did not use the mailers had a no-show rate that was less than 7 percent during the 4th quarter 1993. There are many variables that affect the patient no-show rate and these clinics proved that the rate will vary due the affect of these variables.

**3. Clinics that treat a life treating disease process have a lower no-show rate than clinics that are perceived to treat a disease that is a matter of convenience.**

A clinic like Cardiology displayed a lower no-show rate than a clinic like Ophthalmology because of the perception of the patient as to the importance of the clinic visit. This would result in a clinic like Ophthalmology having to worry more about the patient no-show rate and clinic like Cardiology not having to spend as much effort to affect their no-show rate. This conclusion is supported by the literature that stated that the no-show rate for urgent care was much less than that of routine care. This conclusion has implications as to where the focus of appointment

reminders should be, it should not be in the clinics that are perceived as being for urgent life threatening care such as Cardiology.

**4. The cost of producing the patient mailers must be evaluated by individual clinic because the total numbers for the program are not representative.**

Mailers are a relatively inexpensive form of reducing the cost of no-shows in a given clinic. Even though the individual cost of the mailers is small, if the program is implemented across the board it could have a financial burden on the hospital. Each clinic's no-show rate must be evaluated to determine if the no-show rate can be affected by the use of the mailers. This was demonstrated in this study because the total program was not proven to be cost-effective. It actually experienced a $10,676.26 loss. Even though the total program was not cost-effective, an individual clinic like Ophthalmology saved $14,496.89.

**5. The current system of producing the mailer can be improved.**

The current mailers are taking up too much of the time of the appointment staff in the individual clinics. This process can be improved simply by relying on CHCS and not having to re-check each mailer. If CHCS is trusted as a system then the computer room staff can just print the mailers and send them to the mail room, thus streamlining the process. If a form of verification is needed, it can be done through CHCS at a terminal rather than the current system of picking up the mailers and tearing off the top sheet.

## Recommendations

**1. Continue to use patient mailers in clinics that are currently using them that have a no-show rate of 7 percent or greater, and implement them in clinics that have a greater than 7 percent no-show rate.**

The mailers are a cost-effective system as compared to the cost of the no-shows. But, they will not have a significant impact on clinics with a low no-show rate. If a clinic is already using the mailer it should be discontinued if the clinic no-show rate is below 7 percent. The clinics that are discontinued should be monitored closely to determine if the mailers truly are not affecting the no-show rate. This can easily be accomplished by monitoring the monthly recap report and looking at the no-show rate for the clinics. If a clinic has a no-show rate of greater than 7 percent they should implement the mailer system. Additionally, clinics that are currently using the system and display a greater than 7 percent no-show rate should continue to use the system.

**2. Streamline the process of producing the patient mailers in the clinics that are already in place.**

The system of producing the mailer and sending it out could be easily simplified by trusting CHCS and not requiring the clinic appointment staff to go pick up the mailers after they are printed out in the computer room. The process should consist of the clinic appointment staff flagging the provider's profile to generate the mailer on the appropriate duration from the appointment. The computer room should then print out the mailer and send the mailers to the mail room to be sent out. The clinic staff could verify the mailers going out through CHCS, not by going to pick up the mailers after they have been printed. To accomplish this process, a new

form will need to be purchased that will not involve the cover sheet being torn off. Until this new form is in place the computer room staff could easily tear off the cover sheet in bulk with the use of a collating machine.

**3. Reevaluate the appointment process in the clinics.**

Although a detailed analysis of the appointment system was not the focus of this study the systems that are currently in place were looked at and they could use some refinement. Many of the clinics at NMCSD are different but many are the same with different appointment systems in place. By sharing some of the positive ideas between clinics, the appointment system and patient access to care at NMCSD could be improved.

## IX. Implication for Further Research

A study of the cost of implementing an automated telephone reminder system should be evaluated, similar to the one being used by the Veterans Administration Medical Center (VAMC) in San Diego, CA.. This system eliminates the cost of the mailers and has been shown in the literature to have the same or greater positive effect on patient no-show rates than the mailers. By implementing this system, there would be an initial cash outlay to purchase the system but the recurring cost of printing the mailer and mailing them would be eliminated. The results of the study would be used to evaluate the cost-effectiveness of an automated phone reminder system at NMCSD.

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